

REPORT FROM THE MEDICAL PRACTICE

The Citric Acid Cycle and Intermediary Catalysts

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Maintaining a basic energy level in the body is of key importance in treating and preventing chronic diseases. The fundamental energy cycle of the body is cellular respiration, also referred to as cellular metabolism. Cellular respiration is the complex series of chemical reactions by which a living cell breaks down a fuel molecule into carbon dioxide and water to obtain the energy within the chemical bonds. In chronic diseases, the enzymatic reactions and metabolic pathways of cellular respiration are disrupted or blocked. This article discusses the importance of cellular respiration and a currently available therapeutic treatment that will restimulate the pathways of cellular respiration to help rebuild the body's energy to overcome disease.

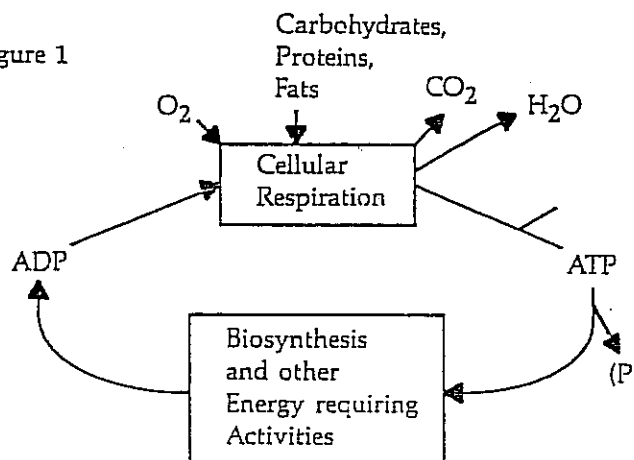
It is not the scope of this article to delve into all the steps and enzymatic reactions of cellular respiration; a good biochemistry text will do that.

In spite of having a healthy lifestyle, sickness and chronic disease can still touch everyone. Once the disease process has penetrated past the natural resistance forces of the body, what therapeutic measures can be taken to arrest and reverse the process and build support for rejuvenation? Modern medicine approaches these problems with pharmaceutical drugs, and failing that, surgery. The side effects of drugs are well documented. Surgery is also not without its risks. Energetic medicine (holistic, whole body medicine) can help, but the recovery can be slow in chronic problems.

The body takes in food which must be converted into a form that can be used as a fuel by the cells. The fuel molecule of the cells is Adenosine Triphosphate (ATP). The energy in ATP is stored in "high energy" phosphate bonds. ATP has three phosphates with two "high energy" bonds holding them together. Whenever the cells need energy to make a reaction occur, ATP contributes the energy in one of its bonds to make it happen. ATP then loses one of its phosphates and becomes Adenosine Diphosphate (ADP). *The regeneration of ATP from ADP is of fundamental concern in the management of the body's resources in maintaining an energy supply. Cellular respiration is the two-phase process that produces and regulates the production of ATP.*

Figure 1 illustrates the ATP Regeneration Cycle. ATP is regenerated from the metabolism of foods. Oxygen is required, and carbon dioxide and water are the by-products. ATP is converted to ADP as it is used as an energy source. ADP is reconverted to ATP by cellular respiration.

Figure 1



The two phases of cellular respiration are: 1) Glycolysis and 2) the Citric Acid Cycle. Both phases take place inside the cell. Glycolysis (the breakdown of sugar) takes place in the open liquid portion of the cell — the cytoplasm. The citric acid cycle takes place in a special organ-like structure of the cell called the mitochondria. The glucose molecule is broken down to a compound called pyruvic acid (a 3 carbon compound that acts as an intermediate stage in going from the glycolysis phase to the citric acid cycle). Pyruvic acid is then taken to the mitochondria where it enters the citric acid cycle and continues to be broken down to carbon dioxide and water.

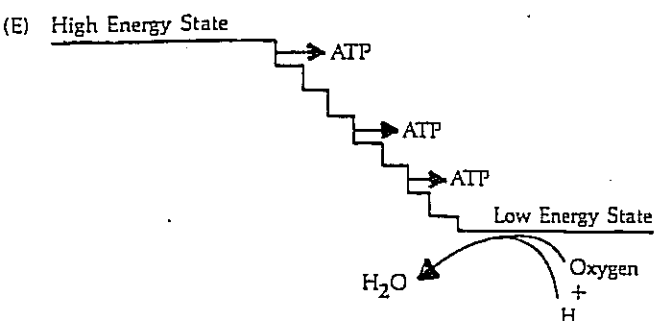
An integral part of the citric acid cycle is the electron transport system. It is here that the majority of the ATP's are made. As the pyruvic acid is incorporated into the citric acid cycle and then broken down by enzymatic reactions, carbon

oxide, hydrogen atoms, and electrons are released. The carbon dioxide finds its way to the lungs and is breathed out. A large majority of the carbon dioxide we breathe out comes from cellular respiration. The hydrogen atoms combine with oxygen to form water. This making of water happens after the electrons have been passed along the electron transport system. The electron transport system is a step-by-step series of reactions which pass the electrons from a "high" energy state to a lower energy state, extracting out energy along the way.

Figure 2 shows how an electron from the Citric Acid Cycle is passed along in a step-wise manner from a high energy state to a lower state of energy. This allows energy to be extracted along the way as ATP. At the end step, oxygen picks up the electron and combines with a hydrogen ion to form water.

Figure 2

Electron Transport System



At the end of the transport system, oxygen uses the electrons to combine with hydrogen to form water. If there is a lack of oxygen at this end step, the whole citric acid cycle stops. This whole process of cellular respiration illustrates the importance of oxygenating the body by adequate exercise. Some daily brisk walking will increase the uptake of oxygen and help to release the carbon dioxide produced by the metabolism of glucose. This coordinates the dual processes of internal respiration (breathing in and out) and cellular respiration (cellular metabolism).

There are many vitamins, co-factors, enzymes, and other compounds involved in this essential process of ATP manufacture. There can be many reasons why the citric acid cycle is stopped, retarded, or blocked. Drugs, allergens, environmental toxins, and diseases block or disrupt the citric acid cycle by interfering with either the enzymes or the intermediate compounds of the cycle. Because the citric acid cycle is so fundamental to energy production, it's no wonder that one feels sick and run down when there is a disturbance in ATP production.

In chronic disease, a primary concern is stabilizing the disease process and working out a therapeutic plan to rebuild health. The reactivation of the citric acid cycle should be a consideration and could be used as an adjuvant with other therapeutic modes.

The HEEL Company of West Germany makes homeopathic

products called "Bio-Catalysts of the Citric Acid Cycle". HEEL is one of the largest producers of homeopathic products in West Germany and has a very modern factory which the authors have visited. They are very scientifically-oriented and have an excellent research staff to test and find new applications for their products.

The "Bio-Catalyst" products contain all the intermediates of the citric acid cycle. The citric acid cycle works much like a circular conveyor system. Pyruvic acid, from the glycolysis phase, is brought into the citric acid by chemically attaching itself to one of the intermediate acids of the cycle. This combination of the intermediate and the pyruvic part is then acted on by enzymes. The intermediate passes along what's left to another intermediate in the cycle and regenerates itself. In this way, only the pyruvic acid part is acted upon by enzymes and the citric acid intermediate stays whole. This is the definition of a catalyst. It helps the reaction but doesn't become part of it. The enzymes act on the pyruvic acid part to release carbon dioxide and hydrogen atoms.

The citric acid cycle is a sequential process; one step follows the next. Any disruption in the cycle stops the process. The therapeutic idea behind the "Bio-Catalyst" products is to administer the citric acid cycle intermediates in a series of steps, until all the intermediates have been taken. If there is a particularly strong reaction at any one of the steps, attention can be focused on that intermediate which can be given as part of the therapy program. Research has shown that the addition of specific enzyme substances will induce the enzymes into action. By the addition of a citric acid cycle intermediate, the enzyme that interacts with it will be induced into action. This way, if the citric acid cycle is disrupted at any point, adding the intermediate at that point will cause the cycle to pick up again. ATP will be produced and energy will be available to the body for reactions and to ward off disease. Overall health will pick up.

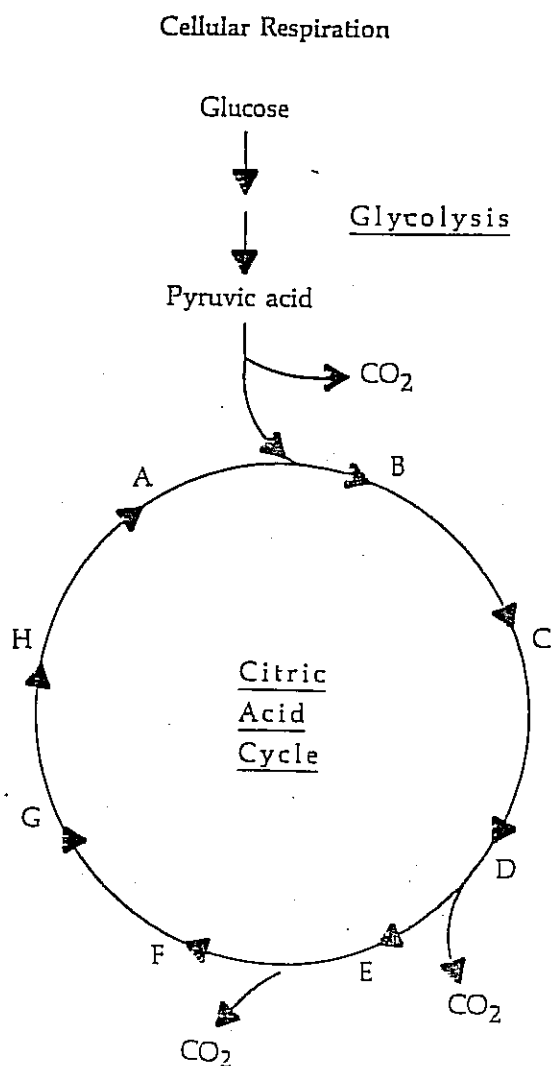
Treatment Procedures

The "Bio-Catalyst" products come as a collective packet of 10 ampules. The ampules are to be taken in a series of 4 steps. It is recommended that there be a wait of 4-5 days between each step. The steps are designed so that they follow the step-wise reactions of the citric acid cycle. The following are the 4 steps and the intermediates in each step. Each intermediate has a letter following it which refers to its position in the citric acid cycle as shown in Figure 3.

- Step 1 Magnesium-Manganum-phosphoricum-Injeel
+Natrium pyruvicum-Injeel
+Natrium oxalacticum-Injeel (A)
- Step 2 Acidum citricum-Injeel (B)
+Acidum cis-aconiticum-Injeel (C)
- Step 3 Baryum oxalsuccinicum -Injeel (D)
+Acidum alpha-ketoglutaricum-Injeel (E)
- Step 4 Acidum succinicum-Injeel (F)
+Acidum fumaricum-Injeel (G)
+Acidum DL-malicum-Injeel (H)

Figure 3 illustrates the staged process of cellular respiration. In the first stage, Glycolysis, glucose is broken down to pyruvic acid. In the second stage, the Citric Acid Cycle, pyruvic acid is further broken down to carbon dioxide.

Figure 3



It is recommended that the ampules of each step be mixed together and then either injected or taken orally. The injections can be administered either subcutaneously or intramuscularly. Orally, the contents of the ampules are placed in a glass of water and then the mix is sipped throughout the day. The program starts by administering step one, waiting 4 days; then step 2; and so on until all the steps are completed. If there is noticeable pick-up in patient energy, or improvement in well-being, then the individual intermediates of that step can be taken as a therapeutic adjuvant. Individual intermediates are available from HEEL and other companies. The series can be repeated, if necessary, after a pause of 2-4 weeks upon completing the first whole series.

As a preventive measure, the series can be administered once or twice a year to restimulate and rejuvenate the citric acid cycle. Many vitamins, co-factors, and minerals are involved in the reactions of the citric acid cycle, in conjunction with the "Bio-Catalyst" products, a vitamin and mineral

supplement program would be recommended.

HEEL also has a product called "Ubichinon Compositum" that has elements of the electron transport system with vitamin co-factors and plant remedies. This preparation can be used to help support the restimulation of the citric acid cycle.

In Summary

Where the disease processes have penetrated deep into the body, such as in chronic diseases, there is need for a therapeutic approach to restimulate the body's defensive capabilities. All the activity and enzymatic reactions needed for this require ATP as the fuel for these reactions.

ATP is produced in the cells by the two-staged process of cellular respiration. The majority of the ATP is produced in the citric acid cycle of cellular respiration. To restimulate and increase the production of ATP, the intermediates of the cycle are given in a homeopathic form. The intermediates are given in their natural sequential order so that each step of the cycle can be observed and evaluated. If a particular step is beneficial, then therapeutic efforts can be focused on that step.

By following this therapeutic procedure, the enzymes of the citric acid cycle are activated and ATP production increases. This makes energy available for the healthful reactions needed to combat disease.

ATP production is a complex, multisteped process that requires many resources of the body. It is the process by which we extract energy from the foods we eat. It is closely allied to normal respiration. Most of the carbon dioxide we breathe out is the result of the breakdown of glucose. Almost all the oxygen we breathe in is consumed in the hydrogen ions produced by the citric acid cycle. This important function of ATP production makes it a good place to focus therapeutic energy because its healthy functioning will insure enough energy to combat and/or prevent disease.

This approach to solving chronic disease problems and reestablishing health blends together modern scientific biochemistry with homeopathic principles of the energetic preparation of remedies. The future of medicine lies in the synthesis of diverse medical thoughts to produce therapeutic ideas and treatments that have a sound scientific basis and are beneficial to the patient.

About the Authors

William Schaefer is a Doctor of Oriental Medicine and a Licensed Acupuncturist who has extensively studied German electro-diagnostic methods of biological medicine. He is the author of the guide *Chinese Herbs*. His practice is in Encinitas, California.

Peter Sierck is a graduate of the Naturopathic College in Hamburg, West Germany. For five years as a practitioner and director of the Center for Naturopathic Medicine and Acupuncture in Hamburg he utilized acupuncture and homeopathy in the treatment of environmental illnesses and allergies. He is the founder of Environmental Testing & Technology, Inc. based in San Diego, California, a firm which provides inspection and testing for indoor air, water, and electromagnetic pollution.